REMARKS

Claims 1-27, 29 and 32 are currently pending in the present application. The Examiner has withdrawn claims 8-12 and 20-23 as being directed to a non-elected species. Claims 1 and 13-23 are amended herein and claims 2-7, 24 and 32 are canceled herein, without prejudice. Withdrawn claims 12 and 21-23 are also amended herein. Applicants respectfully request reconsideration of this application in view of the following remarks.

Claims 1-7, 13-19, 24-27 and 29 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the enablement requirement. The Final Action contends that the disclosure as originally filed is directed to very limited types of modified surfaces and devices, very limited types of environments, very limited types of particles and very limited means of modifying a surface to achieve the recited matching of LW surface free energy. *Final Action*, page 2. The Final Action also alleges that the disclosure as originally filed fails to enable one of ordinary skill in the art to adjust the LW surface free energy of various surfaces as to achieve the required match with the LW surface free energy of various particles. *Id.*

In order to expedite prosecution, and without prejudice, Applicants have amended the claims to recite specific modified surfaces (surfaces modified with diamond-like carbon (DLC), Ag--PTFE-surfactant or Ni--Cu--P—PTFE), specific devices (those which comes into contact with cells, proteins and/or prions within a living human or animal body), specific types of environments (solutions and/or whole blood) and specific types of particles (cells, proteins and/or prions). Applicants submit that the skilled artisan at the time of the invention would clearly have been able to modify the surfaces recited in the present claims to vary the LW surface free energy given the teachings in the present application and the knowledge of one of ordinary skill in the art.

At the outset, Applicants emphasize that the surface free energy values recited in the present claims are equivalent to the interfacial free energy. In the presently claimed invention, there are three types of surface free energies (or interfacial free energies):

(1) Surface free energy of solid surfaces (modified surfaces) in air. It is also called the interfacial free energy between the solid surface and air. In the recited equations, this is represented by $\gamma^{LW}_{surface}$.

(2) Surface free energy of particles (cells, proteins and/or prions) in air. It is also called the interfacial free energy between the particle surface and air. In the recited equations, this is represented by $\gamma^{LW}_{cells,\ proteins\ and/or\ prions}$.

(3) Surface free energy of the environment (solutions and/or whole blood) in air. It is also called the interfacial free energy between the fluid surface and air. In the recited equations, this is represented by $\gamma^{LW}_{solution\ and/or\ whole\ blood}$.

It is to be appreciated therefore that each value is calculated in reference to air. It is thus only necessary to measure a surface free energy for a particular coating to be modified, as well as determining the surface free energy of the cells, proteins and/or prions and the surface free energy of the solution and/or whole blood in which the cells, proteins and/or prions will be present. The diamond-like carbon (DLC), Ag--PTFE-surfactant or Ni--Cu--P—PTFE can then be modified to adjust the LW free energy accordingly.

As an example, Sharma et al. (Sharma, P.K., et al., Analysis of different approaches for evaluation of surface energy of microbial cells by contact angle goniometry, *Advances in Colloid and Interface Science*, 98 (2002) 341-463; "Sharma") measured the surface free energy of 147 bacteria, and found that the average of the LW surface free energy of these bacteria ($\gamma^{LW}_{cells,\ proteins\ and/or\ prions}$) was 35.57 mN/m (see pages 409 and 417). The LW surface free energy of water, blood or urine ($\gamma^{LW}_{solution\ and/or\ whole\ blood}$) is about 21.8 (Sharma, page 418). According to equation 1 in Claim 1, the value for the minimum level of bacterial attachment to a surface is

$$\gamma^{LW}_{surface} \approx \gamma^{LW}_{S,\ min} \approx 28.26\ mN/m$$

With this value, the skilled artisan can then modify the surface energy of a particular surface using one of the recited materials, so as to alter the value of the chosen surface to

approximately 28.26 mN/m. The skilled artisan is well aware of how to modify the surfaces based on the teaching of the present invention and hence can easily arrive at the desired surface free energy value. As shown in Figure 1 in the present application, DLC can be doped with various elements and a particular concentration to obtain the desired surface free energy.

Applicants further submit that the skilled artisan would understand how to modify the surface free energy value of a surface by modification with Ag-PTFE-surfactant and Ni-Cu-P-PTFE materials. Applicants note that for the Ag-PTFE-surfactant coating, the surfactant is in fact present in order to assist with the coating of the PTFE and a skilled artisan would readily understand that increasing concentrations of PTFE would serve to reduce the surface free energy value, as it is well known that PTFE reduces the surface free energy of materials. Thus, in order to control the surface free energy value, one need only vary the amount of the PTFE present in the material. The same is true for the Ni-Cu-P-PTFE material, as the Ni-Cu-P element is an alloy. Thus, once the surface free energy value of the Ni-Cu-P alloy is known, it will be understood by the skilled artisan that increasing amounts of PTFE will serve to reduce the surface free energy value. Thus, Applicants submit that the skilled artisan would be able to easily vary the relevant ratios of the materials as described in order to match or approximately match the surface free energy values of the modified surface with that of the cells, proteins and/or prions to be repelled.

Applicants further note that although the examples in the present specification relate to bacteria, the methodology taught therein may be used for other cells, proteins and/or prions. All one need do is calculate the surface free energy value of the desired cells, proteins and/or prions in their environment and then given the knowledge of how various dopants modify the surface free energy value of DLC, or how PTFE modifies the surface free energy value of Ag or Ni-Cu-P, the skilled artisan will be able to easily manufacture a surface which possesses the same or approximately the same surface free energy value as that of the cells, proteins and/or prions in the chosen environment.

As such, for at least the foregoing reasons, Applicants submit that Claims 1, 13-19, 25-27 and 29 are enabled. Thus, Applicants respectfully request that the present rejection be withdrawn, that withdrawn Claims 8-12, 20-23 be rejoined and that a Notice of Allowance be issued in due course. The Examiner is invited and encouraged to contact the undersigned directly in order to expedite the prosecution of the pending claims to issue. In any event, any questions that the Examiner may have should be directed to the undersigned, who may be reached at (919) 854-1400.

Respectfully submitted,

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